

CLAIMS

- 5 1. An antenna element comprising:
a first antenna unit (21, 23, 24, 25, 26) formed so as to extend in one direction; and
a second antenna unit (22) extending substantially orthogonal to the extending direction of said first antenna unit (21, 23, 24, 25, 26), having an electrical length of substantially $(\lambda/2) \times A$ (A is an integer), and coupled to said first antenna unit (21, 23, 24, 25, 26).
- 10 2. The antenna element according to claim 1, wherein said first antenna unit (21, 23, 24, 25, 26) has an electrical length of approximately $(\lambda/4) + (\lambda/2) \times B$ (B is an integer).
- 15 3. The antenna element according to claim 1, wherein said first antenna unit (21, 23, 24, 25, 26) includes at least one type of antenna selected from the group consisting of a plate antenna (25, 26b), a monopole antenna, a helical antenna (23), a meander line antenna (21, 26a) and a zigzag antenna (24).
- 20 4. The antenna element according to claim 1, wherein said second antenna unit (22) includes a line antenna (22a, 22c).
- 25 5. The antenna element according to claim 4, wherein said line antenna (22a, 22c) includes at least one type of antenna selected from the group consisting of a monopole antenna (22c) and a helical antenna (22a).
- 30 6. The antenna element according to claim 1, further comprising a substrate (11) with a conductive surface,
said first antenna unit (21, 23, 24, 25, 26) being provided on the surface of said substrate (11) with a dielectric (31) therebetween, and
said second antenna unit (22) being provided so as to extend from said substrate (11).

7. The antenna element according to claim 1, wherein said first antenna unit (21, 23, 24, 25, 26) and said second antenna unit (22) are attached in order to a feeding point (12).

8. A portable information terminal comprising:
a main unit case (10); and

an antenna element (20a-20h) including a first antenna unit (21, 23, 24, 25, 26) arranged within said main unit case (10), and formed to extend in one direction, and a second antenna unit (22) extending substantially orthogonal to the extending direction of said first antenna unit (21, 23, 24, 25, 26), and arranged projectable from said main unit case (10), having an electrical length of approximately $(\lambda/2) \times A$ (A is an integer), and coupled to said first antenna unit (21, 23, 24, 25, 26).

9. The portable information terminal according to claim 8, wherein said second antenna unit (22) comprises a third antenna unit (22a) having an electrical length of approximately $(\lambda/2) \times C$ (C is an integer), and a fourth antenna unit (22c) coupled to said third antenna unit (22a), and having an electrical length of approximately $(\lambda/2) \times D$ (D is an integer), said third and said fourth antenna units (22a, 22c) projecting from said main unit case (10) when said antenna element (20a-20h) is pulled out from said main unit case (10), and

said third antenna unit (20a) projecting from said main unit case (10) and said fourth antenna unit (20c) located in said main unit case (10) when said antenna element (20a-20h) is stored in said main unit case (10).